

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

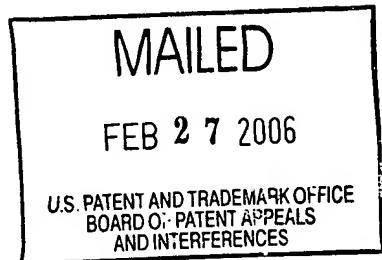
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Ex parte SANG-BOM KANG, SEONG-GEON PARK, CHANG-WON LEE and GIL-HEYUN CHOI

Appeal No. 2006-0314  
Application No. 10/050,195

ON BRIEF



Before KRASS, JERRY SMITH and BLANKENSHIP, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-14 and 25-32. Appellants are not appealing the examiner's rejection of claims 1-3 and 7-14 [brief, page 1]. Accordingly, this appeal is directed to the rejection of claims 4-6 and 25-32.

The disclosed invention pertains to a contact plug of a

Appeal No. 2006-0314  
Application No. 10/050,195

semiconductor device which is formed through an insulating film interposed between a lower conductive layer and an upper conductive layer to electrically connect the lower conductive layer to the upper conductive layer.

Representative claims 1, 4 and 5 are reproduced as follows:

1. An integrated circuit device, comprising;

a substrate;

an insulating layer disposed on the substrate having a gap formed therein;

a liner layer that exhibits compressive stress characteristics disposed on sidewalls of the insulating layer, which define the gap, and on the substrate in the gap;  
and

a contact plug that exhibits tensile stress characteristics disposed directly on the liner layer.

4. The integrated circuit device of Claim 1, further comprising:

an ohmic layer disposed between the liner layer and the sidewalls of the insulating layer, and between the liner layer and the substrate.

5. The integrated circuit device of Claim 4, wherein the ohmic layer comprise titanium (Ti).

The examiner relies on the following references:

Chang et al. (Chang)	5,672,543	Sep. 30, 1997
Taguwa et al. (Taguwa)	6,107,190	Aug. 22, 2000
Nagasaki et al. (Nagasaki)	6,300,683	Oct. 09, 2001
Moise et al. (Moise)	6,534,809	Mar. 18, 2003 (filed Dec. 19, 2000)

Claims 4 and 5 stand rejected under 35 U.S.C. § 102(b) as

Appeal No. 2006-0314  
Application No. 10/050,195

being anticipated by the disclosure of Chang. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Chang taken alone. Claims 25-29, 31 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Chang and Taguwa in view of Moise. Claim 30 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Chang, Taguwa and Moise in view of Nagasaka.

Rather than repeat the arguments of appellants or the examiner, we make reference to the brief and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of anticipation and obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the brief along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon supports each of the examiner's rejections. Accordingly, we affirm.

We consider first the examiner's rejection of claims 4 and 5 as being anticipated by Chang. Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. dismissed, 468 U.S. 1228 (1984); W.L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

The examiner has indicated how the invention of these claims is deemed to be fully met by Chang [answer, pages 3-4]. With respect to claim 4, appellants argue that layer 24 of Chang, which was identified by the examiner as the claimed ohmic layer, is not an ohmic layer at all [brief, pages 3-5]. The examiner responds that layer 24 of Chang has the same structure and formation process as the ohmic layer in appellants' invention. The examiner also responds that layer 24 of Chang must be ohmic if the corresponding titanium layer of the claimed invention is ohmic [answer, pages 8-10].

We will sustain the examiner's rejection of claim 4 for essentially the reasons argued by the examiner in the answer. Appellants have not provided a convincing argument as to why the titanium layer 24 of Chang is not an ohmic layer even though they have disclosed a titanium ohmic layer located exactly as disclosed in Chang and deposited in a similar manner. We are of the view that the examiner has established a prima facie case of anticipation which has not been persuasively rebutted by appellants.

With respect to claim 5, appellants argue that Chang fails to disclose that the ohmic layer comprises titanium as claimed. Appellants argue that the titanium glue layer of Chang does not meet the claimed invention [brief, page 6]. The examiner responds that this issue was argued in the response to claim 4 [answer, page 10].

We will sustain the examiner's rejection of claim 5. As noted above, we find that layer 24 of Chang is an ohmic layer as claimed. Since the layer 24 is either a titanium glue or a thick layer of titanium which is nitrided [column 3, lines 8-19], this ohmic layer clearly comprises titanium as claimed.

We now consider the rejections under 35 U.S.C. § 103. In

Appeal No. 2006-0314  
Application No. 10/050,195

rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or

evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived [see 37 CFR § 41.37(c)(1)(vii) (2004)].

The examiner has indicated how the claimed invention is deemed to be unpatentable over the applied prior art [answer, pages 4-8]. The examiner's findings in support of the rejections are sufficiently thorough and logical to establish a prima facie case of obviousness. Appellants only argue the rejection with respect to claim 25. Appellants' arguments with respect to claim 25 are the same arguments we considered above with respect to claim 4. Therefore, we sustain the examiner's rejection of claim 25 for the same reasons discussed above with respect to claim 4. Since appellants have not separately argued the rejection of claims 6 and 25-32, and since the examiner has established a prima facie case of obviousness with respect to these claims, we also sustain the

Appeal No. 2006-0314  
Application No. 10/050,195

In summary, we have sustained each of the examiner's rejections of the claims on appeal. Therefore, the decision of the examiner rejecting claims 4-6 and 25-32 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

  
ERROL A. KRASS

Administrative Patent Judge )

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APPEALS  
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JERRY SMITH

Administrative Patent Judge )

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HOWARD B. BLANKENSHIP )

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Appeal No. 2006-0314  
Application No. 10/050,195

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